AMENDMENTS TO THE CLAIMS

The following set of claims replaces all previous versions of claims:

1-105. (Cancelled)

106. (Currently amended) An isolated recombinant protein comprising a variant of wild-type *Photinus pyralis* luciferase of SEQ ID NO:37, wherein the amino acid sequence of said recombinant protein has no more than 30 amino acid differences as compared to the amino acid sequence of SEQ ID NO:37, wherein the recombinant protein has alanine at each residue corresponding to [[~~of~~]] positions 214 and 232 of SEQ ID NO:37, and wherein the recombinant protein has luciferase activity and increased thermostability as compared to the wild-type *Photinus pyralis* luciferase of SEQ ID NO:37.

107-108. (Cancelled)

109. (Currently amended) The isolated recombinant protein of claim 106, wherein the recombinant protein further comprises an amino acid other than glutamic acid at the residue corresponding to ~~further comprising a substitution at~~ position 354 of SEQ ID NO:37 ~~to other than glutamic acid~~.

110-111. (Cancelled)

112. (Previously presented) An isolated nucleic acid which encodes the recombinant protein according to claim 106.

113. (Previously presented) A vector comprising the nucleic acid according to claim 112.

114. (Previously presented) An isolated cell transformed with the vector according to claim 113.

115. (Previously presented) The cell according to claim 114 which is a prokaryotic cell.

116. (Previously presented) The cell according to claim 114 which is a plant cell.

117. (Previously presented) A plant comprising the cell according to claim 116.

118. (Previously presented) A bioluminescent assay comprising the steps of:
contacting the recombinant protein of claim 106 with luciferin and detecting bioluminescence.

119. (Previously presented) A kit comprising the recombinant protein according to claim 106.

120. (Previously presented) The kit according to claim 119 which further comprises luciferin.

121-124. (Cancelled)

125. (Currently amended) An isolated recombinant protein comprising the amino acid sequence of SEQ ID NO:41, wherein the recombinant protein has luciferase activity and increased thermostability as compared to wild-type *Photinus pyralis* luciferase.

126. (Currently amended) An isolated recombinant protein comprising the amino acid sequence of SEQ ID NO:42, wherein the recombinant protein has luciferase activity and increased thermostability as compared to wild-type *Photinus pyralis* luciferase.

127-128. (Cancelled)

129. (Previously presented) An isolated nucleic acid which encodes the recombinant protein according to claim 125.

130. (Previously presented) An isolated nucleic acid which encodes the recombinant protein according to claim 126.

131-132. (Cancelled)

133. (Previously presented) A vector comprising the nucleic acid according to claim 129.

134. (Previously presented) A vector comprising the nucleic acid according to claim 130.

135-136. (Cancelled)

137. (Previously presented) An isolated cell transformed with the vector according to claim 133.

138. (Previously presented) An isolated cell transformed with the vector according to claim 134.

139-140. (Cancelled)

141. (Previously presented) The cell according to claim 137 which is a prokaryotic cell.

142. (Previously presented) The cell according to claim 138 which is a prokaryotic cell.

143-144. (Cancelled)

145. (Previously presented) The cell according to claim 137 which is a plant cell.

146. (Previously presented) The cell according to claim 138 which is a plant cell.

147-148. (Cancelled)

149. (Previously presented) A plant comprising the cell according to claim 145.

150. (Previously presented) A plant comprising the cell according to claim 146.

151-152. (Cancelled)

153. (Previously presented) A bioluminescent assay comprising the steps of:
contacting the recombinant protein of claim 125 with luciferin and detecting bioluminescence.

154. (Previously presented) A bioluminescent assay comprising the steps of: contacting the recombinant protein of claim 126 with luciferin and detecting bioluminescence.

155-156. (Cancelled)

157. (Previously presented) A kit comprising the recombinant protein according to claim 125.

158. (Previously presented) A kit comprising the recombinant protein according to claim 126.

159-160. (Cancelled)

161. (Previously presented) The kit according to claim 157 which further comprises luciferin.

162. (Previously presented) The kit according to claim 158 which further comprises luciferin.

163. (Currently amended) An isolated recombinant protein comprising a variant of wild-type *Photinus pyralis* luciferase of SEQ ID NO:37, wherein the amino acid sequence of said recombinant protein has no more than 30 amino acid differences as compared to the amino acid sequence of SEQ ID NO:37, wherein the recombinant protein has alanine, leucine, and alanine at residues corresponding to positions 214, 215, and 232, respectively, of SEQ ID NO:37, and wherein the recombinant protein has luciferase activity and increased thermostability as compared to the wild-type *Photinus pyralis* luciferase of SEQ ID NO:37.

164-165. (Cancelled)

166. (Currently amended) The isolated recombinant protein of claim 163, wherein the recombinant protein further comprises an amino acid other than glutamic acid at the residue corresponding to ~~further comprising a substitution at~~ position 354 of SEQ ID NO: 37 ~~to other than glutamic acid~~.

167. (Previously presented) An isolated nucleic acid which encodes the recombinant protein according to claim 163.

168. (Previously presented) A vector comprising the nucleic acid according to claim 167.

169. (Previously presented) An isolated cell transformed with the vector according to claim 168.

170. (Previously presented) The cell according to claim 169 which is a prokaryotic cell.

171. (Previously presented) The cell according to claim 169 which is a plant cell.

172. (Previously presented) A plant comprising the cell according to claim 171.

173. (Previously presented) A bioluminescent assay comprising the steps of:
contacting the recombinant protein of claim 163 with luciferin and detecting bioluminescence.

174. (Previously presented) A kit comprising the recombinant protein according to claim 163.

175. (Previously presented) The kit according to claim 174 which further comprises luciferin.